WE CLAIM:

1. A position measuring arrangement for determining a relative position between a first object and a second object, comprising:

a light source comprising a single-mode laser light source that generates radiation;

a signal generator that receives said radiation and generates displacement-dependent output signals that determine a relative position between a first object and a second object; and

a feedback device, wherein said laser light source interacts with said feedback device in such a way that an excitation of several modes takes place in said single-mode laser light source, and a multi-mode operation of said single-mode laser light source results.

2. The position measuring arrangement in accordance with claim 1, further comprising:

a fiber-optical waveguide arranged upstream of said light source, wherein said fiber-optical waveguide comprises:

an input face of said fiber-optical waveguide that receives said radiation from said light source; and

an output face that emits said radiation received by said input face and supplies said emitted radiation to said signal generator.

3. The position measuring arrangement in accordance with claim 1, wherein said feedback device comprises:

a partially reflecting reflector element on which at least a portion of said radiation from said single-mode laser light source impinges, and from which a back-reflection of said radiation into said single mode laser light source results.

4. The position measuring arrangement in accordance with claim 2, wherein said input face comprises a partially reflecting reflection element.

5. The position measuring arrangement in accordance with claim 2, wherein said output face comprises a partially reflecting reflection element.

6. The position measuring arrangement in accordance with claim 2, further comprising:

a first fiber section with a first end face that comprises a partially-reflecting reflection element;

a second fiber section with a second end face that faces said first end face;

wherein said first and second fiber sections feed said radiation from said light source to said signal generator.

7. The position measuring arrangement in accordance with claim 6, wherein said first and second end faces are in contact with each other by an optical plug connection.

8. The position measuring arrangement in accordance with claim 6, wherein an air gap is located between said first and second end faces.

9. The position measuring arrangement in accordance with claim 2, further comprising an optical input device arranged upstream of said input face of said fiber-optical waveguide, which has at least one surface which functions as a partially-reflecting reflection element.

10. The position measuring arrangement in accordance with claim 2, further comprising an optical output device arranged downstream of said output face of said fiber-optical waveguide, which has at least one face functioning as a partially reflecting reflection element.

11. The position measuring arrangement in accordance with claim 3, further comprising a beam splitter element arranged downstream of said light source, which outputs a portion of radiation intensity from said light source and deflects it on

a reflection grating, from where a back reflection of radiation into said single-mode laser light source results.

12. The position measuring arrangement in accordance with claim 3, wherein a partially permeable mirror is used as said partially reflective element arranged outside of said single-mode laser light source.

13. The position measuring arrangement in accordance with claim 1, wherein said single-mode laser light source comprises a single-mode laser diode.

14. The position measuring arrangement in accordance with claim 1, wherein said signal generator comprises:

a scanning grating;

a scale grating; and

an optoelectronic detector element.

15. The position measuring arrangement in accordance with claim 14, wherein said scanning grating and said optoelectronic detector element are arranged in a scanning unit connected with said first object, while said scale grating is connected with said second object.

16. The position measuring arrangement in accordance with claim 15, wherein said output face is connected with said scanning unit and conveys said radiation from said light source to said scanning unit.

17. The position measuring arrangement in accordance with claim 16, wherein, following reciprocal action between said scanning grating and said scale grating, radiation output at said output face impinges on said optoelectronic detector element and, in case of a relative movement between said first and second objects, said displacement-dependent output signal is detected by said detector element.